Claims

1. A recombinant polypeptide or a fragment thereof as shown in (a) or (b):

(a) a polypeptide comprising the amino acid sequence represented by SEQ ID NO: 2; or

(b) a polypeptide comprising an amino acid sequence derived from the amino acid sequence represented by SEQ ID NO: 2 by deletion, substitution, insertion, or addition of 1 or several amino acids and being functionally equivalent to the polypeptide (a).

2. A DNA, which encodes the following polypeptide (a) or (b):

(a) a polypeptide comprising the amino acid sequence represented by SEQ ID NO: 2; or

(b) a polypeptide comprising an amino acid sequence derived from the amino acid sequence represented by SEQ ID NO: 2 by deletion, substitution, insertion, or addition of 1 or several amino acids and being functionally equivalent to the polypeptide (a).

3. A DNA, which comprises the following DNA (c) or (d):

(c) a DNA comprising the nucleotide sequence represented by SEQ ID NO: 1; or

(d) a DNA hybridizing under stringent conditions to a DNA consisting of a sequence complementary to the DNA comprising the nucleotide sequence of SEQ ID NO: 1 and encoding a polypeptide that is functionally equivalent to a polypeptide encoded by the DNA (c).

4. A DNA fragment, which is a fragment of the DNA according to claim 2 or 3 or is a fragment of a DNA that is complementary to the DNA according to claim 2 or 3 and consists of at least 15 nucleotides.

5. A recombinant vector, which comprises the DNA according to claim 2 or 3.

6. A transformant, which comprises the recombinant vector according to claim 5.

7. A method for producing the polypeptide according to claim 1, which comprises culturing the transformant according to claim 6 and collecting the polypeptide from the cultured transformant or the culture supernatant thereof.

8. An antibody, which binds to the polypeptide according to claim 1.

9. A screening method for a compound that binds to the polypeptide according to claim

1, which comprises the steps of:

(a) contacting a sample to be tested with the polypeptide;

(b) detecting the binding activity between the polypeptide and the sample to be tested; and

(c) selecting a compound having activity of binding to the polypeptide.

10. A compound binding to the polypeptide according to claim 1, which can be isolated by the method according to claim 9.

11. A screening method for a compound that inhibits the GDP-fucose transport activity of the polypeptide according to claim 1, which comprises the steps of:

(a) contacting a sample to be tested and GDP-fucose with the polypeptide;

(b) detecting the GDP-fucose-incorporating ability of the polypeptide; and

(c) selecting a compound that inhibits the GDP-fucose transport activity of a polypeptide.

12. A compound that inhibits the GDP-fucose transport activity of the polypeptide according to claim 1, which can be isolated by the method according to claim 11.

13. A cell, which has a Golgi apparatus wherein fucose is decreased.

14. A cell, which exhibits decreased fucose transport ability or lacks such ability.

15. A cell, which exhibits decreased activity of incorporating fucose into a Golgi apparatus, or which lacks such activity.

16. The cell according to any one of claims 13 to 15, which is treated with a compound that binds to a fucose transporter or a compound that inhibits fucose transport activity.

17. A cell, wherein the expression of a fucose transporter is artificially suppressed.

18. The cell according to claim 17, wherein the expression of a fucose transporter is suppressed using RNAi.

19. A cell, wherein a fucose transporter gene is disrupted.

20. The cell according to any one of claims 13 to 19, which is an animal cell.

21. The cell according to claim 20, wherein the animal cell is a Chinese hamster cell.

22. The cell according to claim 20, wherein the animal cell is a CHO cell.

23. The cell according to any one of claims 19 to 22, wherein the gene is disrupted by homologous recombination using a gene targeting vector.

24. A targeting vector, which targets a gene encoding a fucose transporter.

25. The targeting vector according to claim 24, wherein the fucose transporter is a Chinese hamster fucose transporter.

26. A method for producing a recombinant protein, wherein fucose existing in the Golgi apparatus of a host cell is decreased.

27. A method for producing a recombinant protein, wherein the incorporation of fucose into the Golgi apparatus in a host cell is inhibited.

28. A method for producing a recombinant protein, wherein the incorporation of fucose mediated by a fucose transporter in a host cell is inhibited.

29. A method for producing a recombinant protein, wherein fucose transporter functions of a host cell are inhibited.

30. The method for producing a recombinant protein according to any one of claims 26 to 29, wherein the fucose transporter functions are inhibited by artificially suppressing the expression of the fucose transporter in a host cell.

31. The method for producing a protein according to claim 30, wherein the expression of the fucose transporter is suppressed using RNAi.

32. The method for producing a recombinant protein according to any one of claims 26 to 30, wherein the fucose transporter functions are inhibited by deleting a gene encoding the fucose transporter in a host cell.

33. The production method according to any one of claims 26 to 32, wherein the protein is an antibody.

34. The production method according to any one of claims 26 to 33, wherein a protein not having fucose added thereto is produced.

35. The production method according to any one of claims 26 to 34, wherein the host cell is a CHO cell.

36. A method for inhibiting the addition of fucose to a protein, wherein fucose existing in the Golgi apparatus in a host cell is decreased when a recombinant protein is produced using the host cell.

37. A method for inhibiting the addition of fucose to a protein, wherein fucose transporter functions in a host cell are inhibited when a recombinant protein is produced using the host cell.

38. The method for inhibiting the addition of fucose to a protein according to claim 36 or 37, wherein the expression of a fucose transporter is artificially suppressed when a recombinant protein is produced using a host cell.

39. The method for inhibiting the addition of fucose to a protein according to claim 38, wherein the expression of a fucose transporter is suppressed using RNAi.

40. The method for inhibiting the addition of fucose to a protein according to any one of claims 36 to 38, wherein a gene encoding a fucose transporter is deleted when a recombinant protein is produced using a host cell.

41. A method for inhibiting the addition of fucose to a protein, wherein the incorporation of fucose mediated by a fucose transporter is inhibited when a recombinant protein is produced using a host cell.

42. The method for inhibiting the addition of fucose to a protein according to any one of claims 36 to 41, wherein the protein is an antibody.

43. The method for inhibiting the addition of fucose to a protein according to any one of claims 36 to 42, wherein the host cell is a CHO cell.

44. A method for increasing the cytotoxic activity of an antibody, wherein an antibody is produced with a cell in which fucose existing in the Golgi apparatus is decreased.

45. A method for increasing the cytotoxic activity of an antibody, wherein an antibody is produced with a host cell having inhibited fucose transporter functions.

46. A method for increasing the cytotoxic activity of an antibody, wherein an antibody is produced with a cell in which the expression of a fucose transporter is artificially

suppressed.

47. A method for increasing the cytotoxic activity of an antibody, wherein an antibody is produced with a cell that lacks a gene encoding a fucose transporter.

48. A method for increasing the cytotoxic activity of an antibody, wherein an antibody is produced by inhibiting the incorporation of fucose into the Golgi apparatus.

49. The method for increasing the cytotoxic activity of an antibody according to any one of claims 44 to 48, wherein the host cell is a CHO cell.